

## Aaron J. Simon

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**EDUCATION:** Stanford University. M.S. in Mechanical Engineering (Thermosciences). June, 2000  
Stanford University. B.S. in Mechanical Engineering (Economics Minor). June, 1998

### EXPERIENCE:

- 06/11 – present **Energy Group Leader.** Lawrence Livermore National Laboratory, Livermore, CA.  
Initially nominated as Deputy Group Leader for the Energy Group within the Atmosphere, Earth and Energy Division, promoted to Acting Group Leader. Manage and supervise a diverse group of ~15 scientists, engineers, post-doctoral scholars and retirees. Responsibilities include hiring and termination, training and environmental, health and safety compliance, performance appraisal, timekeeping, communication of institutional values and other line management signature authority. Strengthen cohesion between individuals with capabilities as diverse as nuclear fuel cycle risk analysis, biological carbon cycle science and meteorological effects on wind turbines.
- 07/08 – present **Energy Systems Scientist.** Lawrence Livermore National Laboratory, Livermore, CA.  
Manage the development of the Livermore Energy Flow Charts (<http://flowcharts.llnl.gov>) which are a key tool for scientists and policymakers in visualizing the world's and nation's energy systems in the past, present and future. Develop cost estimates and emissions mitigation potential for advanced (fusion and fission) nuclear power technologies under a range of future energy and economic scenarios. Analyze carbon management technologies including hydrogen and carbon capture. Engage the academic "integrated assessment" community to incorporate the latest developments from energy/economic studies into the Livermore's strategic initiatives. Collaborate with industry to deliver Laboratory-developed analytical tools to the marketplace. "Relationship Manager" between Lawrence Livermore and ARPA-E. Scientific Editor (1 yr. appointment, 2013) for Science and Technology Review, LLNL's flagship magazine (<http://str.llnl.gov>)
- 07/03 – 07/08 **Energy Systems Analyst.** Stanford Global Climate and Energy Project, Stanford, CA.  
Evaluated energy conversion technologies in the areas of solar, combustion, biomass, hydrogen, carbon capture, carbon sequestration, electrochemistry, materials and wind. Applied exergy analysis to understand and communicate the thermodynamic limitations and opportunities in individual energy technologies as well as global energy systems. Helped to manage a \$20 million (annual) research portfolio of advanced energy research projects. Authored reports and communications materials for both technical and lay audiences. Supervised a group of ~5 graduate researchers. Developed an open-source Matlab-based interface to the Cantera thermodynamic properties engine for energy systems analysis and teaching purposes (available online). Designed a review process that ensures fair and independent evaluation of research proposals.
- 03/04 – 06/07 **Lecturer.** Stanford Mechanical Engineering Department, Stanford, CA.  
Taught ME 370C, "Advanced Energy Systems III: Projects" (Spring, 2004 - 07). Supervised ~10 independent, quarter-long master's level energy system modeling projects each year. Organized bi-weekly guest lectures on advanced topics in energy conversions. Lectured occasionally on advanced topics such as nuclear energy conversion and solar energy conversion.  
Taught ME 370B, "Advanced Energy Systems II" (Winter, 2007). Delivered bi-weekly lectures on thermodynamics and analysis of advanced energy systems. Developed, solved and graded weekly modeling assignments pertaining to low- and zero- carbon emission energy conversions.  
Consistently received excellent scores on course evaluations.

- 07/01 – 07/03 **Mechanical Engineer.** General Electric Global Research Center, Niskayuna, NY. Developed clean energy technologies as a member of the Combustion Laboratory. Evaluated, at both the conceptual and laboratory level, combustion and aftertreatment innovations for GE's Gas Turbine and Diesel Locomotive product lines. Designed, built, tested and operated bench-scale and micro-scale/combinatorial heterogeneous catalyst discovery reactors. Teamed with external vendors to validate prototype emissions abatement methods and ultra-low level emissions measurement instrumentation. Consulted on design of \$2 million new diesel engine test facility. Received multiple awards recognizing technical excellence and outstanding teamwork.
- 05/00 – 06/01 **Research Assistant.** Stanford Mechanical Engineering Department, Stanford, CA. Investigated "homogeneous charge compression ignition" through the use of variable valve actuation in internal combustion engines. Combined knowledge of thermal sciences and control theory to implement a new combustion strategy with high efficiency and ultra-low NOx emissions.
- 09/98 – 04/00 **Course Assistant.** Stanford Thermosciences Department, Stanford, CA. Led review sessions, held office hours, conducted laboratory sections, developed laboratory experiments and maintained laboratory equipment. Taught "Introductory Thermodynamics," "Advanced Undergraduate Thermodynamics" and "Internal Combustion Engines." Recognized with the "Centennial Teaching Assistant" award as one of the top 4 Course Assistants in the School of Engineering.
- 06/97 – 12/99 **Lab Development.** Stanford Internal Combustion Engine Lab, Stanford, CA. Designed, built and tested engine control, fuel injection, and data acquisition systems around a Chevrolet Corvette engine for use in a class on internal combustion engines. Designed and manufactured custom engine parts, designed and assembled PC-compatible electronic control system, programmed engine control software.

#### **AWARDS AND HONORS:**

- 09/12 Selected as Scientific Editor of Science and Technology Review (<http://str.llnl.gov>)
- 03/10 Completed UCLA Extension's Technical Management Program
- 02/03 A-1 (highest possible) score on GE's internal Performance/Values rating system
- 12/02 Hats-Off Award for technical contribution to NOx emissions project
- 11/02 Polymer/Specialty Chemicals Lab Outstanding Research Project, "NOx Emissions"
- 10/02 Hats-Off Award for co-authoring NIST proposal "Ultralow Emissions System"
- 06/00 Stanford University Centennial Teaching Assistant

#### **SELECTED PRESENTATIONS:**

- 3/12 "Changing the Way the World Uses Energy" Duke University School of the Environment Summer Field Study, Livermore, CA
- 09/11 "Visualizing Global Energy and Carbon Flows" Haas Executive Education Program, Berkeley, CA
- 06/10 "Hydrogen Impacts on Water" Department of Energy Annual Merit Review, Washington, DC
- 06/09 "Air Capture as Part of a Negative Emissions Program" National Energy Technology Laboratory, Pittsburgh, PA
- 11/07 "Exergy and Carbon Flow Charts and the GCEP Portfolio" Schlumberger Doll Research, Cambridge, MA
- 07/06 "2nd Law Comparison of Oxy-Fuel Combustion and Post-Combustion Capture" 2006 ECOS Conference, Aghia Pelagia, Crete, Greece
- 06/06 "GCEP's Energy Systems Modeling Software Framework" Industrial Energy Systems Laboratory, Ecole Polytechnique Federale de Lausanne, Lausanne, Switzerland
- 03/06 "GCEP, Exergy Analysis and the Energy Challenge" Department of Management of Science and Technology, Tohoku University, Sendai, Japan

## PUBLICATIONS AND REPORTS:

C.A. Smith, J. Blink, M. Fratoni, H. Greenberg, W. Halsey, A.J. Simon, and M. Sutton. *Nuclear Energy Return on Investment*. LLNL-TR-577013

C.A. Smith, D.M. Johnson, R.D. Belles and A.J. Simon. *Estimated United States Residential Energy Use in 2005*. LLNL-TR-520271

C.A. Smith, R.D. Belles and A.J. Simon. *Estimated United States Transportation Energy Use in 2005*. LLNL-TR-513773

A.J. Simon, M. Fratoni, C.A. Smith, and W. Halsey. *Energy Return on Investment – Fuel Recycle*, LLNL-TR-497511

C.A. Smith, R.D. Belles, and A.J. Simon. *2007 Estimated International Energy Flows*, LLNL-TR- 473098

C.A. Smith, R.D. Belles, and A.J. Simon. *Estimated Water Flows in 2005: United States*, LLNL-TR- 475772

C. A. Smith, A. J. Simon, R. D. Belles. *Estimated Carbon Dioxide Emissions in 2008: United States*, LLNL-TR-480261

A.J. Simon, S.J. Friedmann, N.B. Kaahaaina and R.D. Aines. Systems Analysis and Cost Estimates for Large Scale Capture of Carbon Dioxide from Air, Energy Procedia: Volume 4, 2011, Pages 2893-2900. 10th International Conference on Greenhouse Gas Control Technologies.

A.J. Simon, W.D. Daily and R.G. White. *Hydrogen and Water: An Engineering, Economic and Environmental Analysis*, LLNL-TR-422193

R. Sassoon, W. Hermann, L. Miljkovic, I. Hsiao, A.J. Simon and S. Benson. *Quantifying the Flow of Exergy and Carbon through the Natural and Human Systems*. Presented at the Materials Research Society Spring Meeting, 2009.

A.P. Simpson and A.J. Simon. *Second law comparison of oxy-fuel combustion and post-combustion carbon dioxide separation*. Energy Conversion and Management, 2007.

State Toolbox for Cantera (software). Available at:  
<http://sourceforge.net/projects/sct-cantera/>

P.A. Caton, A.J. Simon, J.C. Gerdes and C.F. Edwards. *Residual-effected homogeneous charge compression ignition at a low compression ratio using exhaust reinduction*. International Journal of Engine Research, 2003.

N.B. Kaahaaina, A.J. Simon, P.A. Caton and C.F. Edwards. *Use of Dynamic Valving to Achieve Residual Affected Combustion*. SAE Paper 2001-01-0549, 2001.